4.3.1.4 Water Resources

The construction and operation of a pit disassembly/conversion facility would affect water resources. Water resource requirements, and discharges provided in Tables C.1.1.2–1 and C.2.1.2–1 and Table E.3.2.1–1 were used to assess impacts to surface and groundwater. A discussion of impacts is provided for each site separately. Table 4.3.1.4–1 presents No Action surface and groundwater uses and discharges at each site, and the potential changes resulting from construction and operation of the pit disassembly/conversion facility.

Hanford Site

Surface Water. Surface water obtained from the Columbia River would be used as the water source for construction and operation of the pit disassembly/conversion facility. During construction, the quantity of water required would be approximately 1.9 million l/yr (0.5 million gal/yr), which represents a 0.01-percent increase over the existing annual surface water withdrawal. These additional withdrawals would cause negligible impacts. During operation, water requirements for the new pit disassembly/conversion facility would be approximately 94.6 million l/yr (25 million gal/yr), which would represent a 0.7-percent increase over the existing surface water withdrawal.

[Text deleted.]

During construction of the pit disassembly/conversion facility, sanitary wastewater (1.9 million l/yr [0.5 million gal/yr]) would be generated and discharged to the existing wastewater treatment system at the 200-Area. [Text deleted.] During operation, approximately 85.2 million l/yr (22.5 million gal/yr) of sanitary and other wastewater would be discharged to this wastewater treatment system, then to lined evaporation ponds or recycled. This would represent a 34.6-percent increase in the effluent discharged at Hanford. All discharges would be monitored to comply with discharge requirements.

Water from heating the facility would be recycled to the heating unit. Steam plant blowdown would be discharged through the sanitary wastewater system. Steam condensate from heating, condensation from air conditioning, and other distillates would be monitored for radioactivity, and if uncontaminated, discharged to natural drainage channels or evaporation/infiltration ponds. Fire sprinkler water and truck hosedown water would be collected, monitored, sampled, and treated as process wastewater, when required. It would be monitored for radioactivity, and if uncontaminated, discharged to storm drains that discharge to local drainage channels.

The pit disassembly/conversion facility would be located in the 200 Area which is above the 100-year, 500-year, and probable maximum floods; flooding from dam failures; and flooding from a landslide resulting in river blockage.

Groundwater. No groundwater would be used for any project-related water requirements; therefore, groundwater availability would not be affected.

No wastewater would be discharged directly to groundwater; therefore, groundwater quality would not be affected. Some stormwater runoff and other discharges routed to storm drains could percolate into the subsurface. These discharges would be monitored and, therefore, no impacts to groundwater quality would be expected.

Nevada Test Site

Surface Water. No surface water would be withdrawn for construction or operation activities associated with the facility; groundwater would be used as the water source for the pit disassembly/conversion facility. Therefore, there would be no impacts to surface water availability.

Table 4.3.1.4–1. Potential Changes to Water Resources Resulting from Pit Disassembly/Conversion Facility

Affected Resource Indicator	Hanford	NTS	INEL	Pantex	ORR	SRS
Water source	Surface	Ground	Ground	Ground	Surface	Ground
No Action water requirements (million l/yr)	13,511	2,400	7,570	249	14,760	13,247
No Action wastewater discharges (million l/yr)	246	82	540	141	2,277	700
Construction						
Water availability and use						
Total water requirement (million l/yr)	1.9	1.9	1.9	1.9	1.9	1.9
Percent increase in projected water use[a]	0.01	0.08	0.03	0.8	0.01	0.01
Water quality						
Total wastewater discharge (million l/yr)	1.9	1.9	1.9	1.9	1.9	1.9
Percent change in wastewater discharge[b]	0.8	2.3	0.4	1.3	0.08	0.3
Percent change in streamflow	neg	NA	NA	NA	0.004[c]	0.04[d]
Operation						
Water availability and use						
Total water requirement (million l/yr)	94.6	94.6	94.6	94.6	94.6	94.6
Percent increase in projected water use[e]	0.7	3.9	1.2	38.0	0.6	0.7
Water quality						
Total wastewater discharge (million l/yr)	85.2	85.2	85.2	85.2	85.2	85.2
Percent change in wastewater discharge[f]	34.6	103.9	15.8	60.4	3.7	12.2
Percent change in streamflow	neg	NA	NA	NA	0.2[c]	1.7[d]

Table 4.3.1.4–1. Potential Changes to Water Resources Resulting from Pit Disassembly/Conversion Facility—Continued

Affected Resource Indicator	Hanford	NTS	INEL	Pantex	ORR	SRS
Floodplain						
Is action in 100-year floodplain?	No	No	No	No	No	No
Is critical action in 500-year floodplain?	No	Uncertain	Uncertain	No	No	Unlikely

[a] Percent increases in water requirements during construction of the pit/disassembly conversion facility are calculated by dividing water requirements for the facility (1.9 million l/yr) with that for No Action water requirements at each site: Hanford (13,511 million l/yr), NTS (2,400 million l/yr), INEL (7,570 million l/yr), Pantex (249 million l/yr), ORR (14,760 million l/yr), and SRS (13,247 million l/yr).

[b] Percent increases in wastewater discharged during construction of a pit disassembly/conversion facility are calculated by dividing wastewater discharges for the facility (1.9 million l/yr) with that for No Action water requirements at each site: Hanford (246 million l/yr), NTS (82 million l/yr), INEL (540 million l/yr), Pantex (141 million l/yr), ORR (2,277 million l/yr), and SRS (700 million l/yr).

[c] Percent change in stream flow from wastewater discharges is calculated from the average flow of Clinch River (132 m^3/s) and East Fork Poplar Creek (1.5 m^3/s). The comparison for the East Fork Poplar Creek is shown in the table.

[d] Percent change in stream flow from wastewater discharges is calculated from the minimum flow of the Fourmile Branch (0.16 m^3/s).

[e] Percent increases in water requirements during operation of a pit disassembly/conversion facility are calculated by dividing water requirements for the facility (94.6 million l/yr) with that for No Action water requirements at each site: Hanford (13,511 million l/yr), NTS (2,400 million l/yr), INEL (7,570 million l/yr), Pantex (249 million l/yr), ORR (14,760 million l/yr), and SRS (13,247 million l/yr).

[f] Percent increases in wastewater discharged during operation of a pit disassembly/conversion facility are calculated by dividing wastewater discharges for the facility (85.2 million l/yr) with that for No Action discharge at each site: Hanford (246 million l/yr), NTS (82 million l/yr), INEL (540 million l/yr), Pantex (141 million l/yr), ORR (2,277 million l/yr), and SRS (700 million l/yr).

Note: NA=not applicable; neg=negligible. Construction impacts are considered to be temporary, lasting only throughout the construction period. Impacts from operations would occur continuously.

Source: HF 1995a:1; INEL 1995a:1; LANL 1996d; NTS 1993a:4; OR LMES 1995e; PX 1995a:1; PX DOE 1995g; SRS 1995a:2.

[Text deleted.]

During construction of the pit disassembly/conversion facility, approximately 1.9 million l/yr (0.5 million gal/yr) of sanitary wastewater would be generated. During operation, approximately 85.2 million l/yr (22.5 million gal/yr) of sanitary and other wastewater would be discharged to a new wastewater treatment system. After treatment, all wastewater generated during construction and operation would be available for recycle.

Water from heating the facility would be recycled to the heating unit. Steam plant blowdown would be discharged through the sanitary wastewater system. Steam condensate from heating, condensation from air conditioning, and other distillates would be monitored for radioactivity, and if uncontaminated, recycled or discharged to local drainage channels. Fire sprinkler water and truck hosedown water would be collected, monitored, sampled, and treated as process wastewater, when required. It would be monitored for radioactivity, and if uncontaminated, discharged to local drainage channels or be available for recycle.

Because there are no continuously flowing streams on NTS and no designated floodplains, there are no studies to assess the 500-year floodplain boundaries. Studies of the 100-year floodplain showed it to be confined to the Jackass Flats and Frenchman Lake areas. The proposed site for the pit disassembly/conversion facilities is not located in either of these areas. However, since the NTS is in a region where most flooding occurs by locally intense thunderstorms that can create brief (less than 6 hours) flash floods, the facility would be designed to withstand such flooding.

Groundwater. All water required for construction and operation would be supplied from groundwater via the existing supply system. The Lower and Upper Carbonate, the Volcanic, and the Valley-Fill Aquifers are the source of water for operations at NTS.

Total construction water requirements for the facilities (1.9 million l/yr [0.5 million gal/yr]) represent 0.003-percent of the minimum estimated annual recharge to the regional aquifer under the entire NTS. This is based on two studies conducted in recent years which estimated recharge to be 38 to 57 billion l (10 to 15 billion gal) (NT DOE 1992b:41-43; NT USGS 1988a). As shown in Table 4.3.1.4–1, the quantity of water required for construction of the facility represents approximately a 0.08-percent increase over the total projected No Action groundwater usage. Operating the facilities at NTS would require 94.6 million l/yr (25 million gal/yr), which is approximately a 3.9-percent increase in the projected groundwater usage. This additional withdrawal represents a 0.2-percent of the minimum estimated annual recharge. Minimal impacts to groundwater availability would be expected from these additional water withdrawals.

Construction and operation of the pit disassembly/conversion facilities would not result in direct discharges to groundwater. Treated wastewater discharged to disposal ponds, however, could percolate downward into the groundwater of the Valley-Fill Aquifer. This water would be monitored and would not be discharged until contaminant levels were within the limits specified in the State of Nevada permit. Impacts to groundwater quality are therefore not expected. In addition, other factors contributing to a lessening of potential impacts to groundwater are the combined effects of a deep water table, low discharge volumes, and high evaporation rates.

Idaho National Engineering Laboratory

Surface Water. No surface water would be withdrawn for any construction or operation activities associated with the facility; groundwater would be used as the water source for the pit disassembly/conversion facility. Therefore, there would be no impacts to surface water availability.

[Text deleted.]

During construction of the pit disassembly/conversion facility, sanitary wastewater (total of approximately 1.9 million l/yr [0.5 million gal/yr]) would be generated and after treatment discharged to evaporation/percolation ponds or be available for recycle. During operation, approximately 85.2 million l/yr (22.5 million gal/yr) of sanitary and other wastewater would be generated and handled similarly. All discharges would be monitored to comply with discharge limit.

Water from heating the facility would be recycled to the heating unit. Steam plant blowdown would be discharged through the sanitary wastewater system. Steam condensate from heating, condensation from air conditioning, and other distillates would be monitored for radioactivity, and if uncontaminated, discharged to evaporation/infiltration ponds or to local drainage channels. Fire sprinkler water and truck hosedown water would be collected, monitored, sampled, and treated as process wastewater, when required. It would be monitored for radioactivity, and if uncontaminated, discharged to local drainage channels or be available for recycle.

The potential site for the new pit disassembly/conversion facilities is not located in an area historically prone to flooding, but is within the flood zone which could occur as a result of the failure of the MacKay Dam during a maximum probable flood. This flood event would be more critical than either the 100- or 500-year flood. Because INEL is in a region where flash floods could occur, the facilities would be designed to withstand such flooding.

Groundwater. All water required for construction and operation would be supplied from groundwater from the Snake River Plain Aquifer. As shown in Table 4.3.1.4–1, water requirements for operation of the pit disassembly/conversion facility (94.6 million l/yr [25 million gal/yr]) would fall within INEL's current allotment and represent a 1.2-percent increase over the projected annual groundwater usage. As discussed in Section 3.4.4, a groundwater allotment not to exceed 43,000 million l/yr (11,360 million gal/yr), has been negotiated by DOE with the Idaho Department of Water Resources (DOE 1991c:4-73). Construction water requirements for the facility are much less than those for operation. These withdrawals would increase the total site projected amount to be pumped at INEL to 17.8 percent of the allotment during operation. This increase (and that due to construction) should not affect groundwater availability.

Construction and operation of the pit disassembly/conversion facilities would not result in direct discharges to groundwater and would not be expected to contribute to existing near surface contamination. Treated wastewater which does not evaporate, however, could percolate downward toward the groundwater of the Snake River Plain Aquifer. This water would be monitored and would not be discharged until contaminant levels were within the limits specified. Impacts to groundwater quality are therefore not expected. In addition, other factors contributing to a lessening of potential impacts to groundwater are the combined effects of a deep water table, low discharge volumes, and high evaporation rates.

Pantex Plant

Surface Water. No surface water would be withdrawn for construction or operation activities associated with the facility; groundwater (or possibly reclaimed wastewater from the Hollywood Road Wastewater Treatment Plant) would be used as the water source for the pit disassembly/conversion facility. Therefore, there would be no impacts to surface water availability.

[Text deleted]

During construction of the pit disassembly/conversion facility, approximately 1.9 million l/yr (0.5 million gal) of sanitary wastewater would be generated and discharged to the existing wastewater treatment systems north of Zone 12. During operation, a maximum of approximately 85.2 million l/yr (22.5 million gal/yr) of sanitary wastewater and other wastewater would be discharged to either of these wastewater treatment systems. After treatment, all wastewater generated during construction and operation would either be discharged to the playa lakes or would be available for recycle. The expected quantity of additional wastewater potentially discharged to the playas (approximately 0.23 million l/day [61,670 gal/day]) should not cumulatively cause any exceedances of the monthly average limit of 2.46 million l/day (650,000 gal/day). This is based on Pantex's

1994 discharges, which averaged approximately 1.4 million l/day (370,000 gal/day) and are expected to decline in the future.

Water from heating the facility will be recycled to the heating unit. Steam plant blowdown would be discharged through the sanitary wastewater system. Steam condensate from heating, condensation from air conditioning, and other distillates would be monitored for radioactivity, and if uncontaminated, discharged to playas or local drainage channels. Fire sprinkler water and truck hosedown water would be collected, monitored, sampled, and treated as process wastewater, when required. It would be monitored for radioactivity, and if uncontaminated, discharged to playas or local drainage channels, or be available for recycle.

The pit disassembly/conversion facility would be located in Zone 12. Since no 100-year, 500-year, or standard project flood boundaries have been delineated in Zone 12, there would be no impacts to flood plains. However, flooding at Pantex could occur due to the runoff associated with precipitation and ponding in local playas (LLNL 1988a:XVI).

Groundwater. All water required for construction and operation would probably be supplied from groundwater using the existing supply system. Construction water requirements for the pit disassembly/conversion facilities are small relative to the recoverable water in aquifer storage, which for the year 2010 was estimated to be 287 trillion l (76 trillion gal) (PX WDB 1993a:1). As shown in Table 4.3.1.4–1, construction of the proposed pit disassembly/conversion facility would require 1.9 million l/yr (0.5 million gal/yr) of water, which represents a 0.8-percent increase over the projected annual groundwater usage and 0.1 percent of the total groundwater system capacity (1,900 million l/yr [502 million gal/yr]). [Text deleted.] Previous studies have shown that when the Amarillo City Well Field pumped 18.5 billion l/yr (4.9 billion gal/yr) from the Ogallala Aquifer, an average of 1.8-m/yr (5.9-ft/yr) decline in the water table occurred over a 10-year period in the local well field area. This water level decline caused a shift in the groundwater flow direction beneath Pantex. Operating the pit disassembly/conversion facility at Pantex would require 94.6 million l/yr (25 million gal/yr), resulting in a small drawdown. This additional groundwater withdrawal would add to the existing decline in water levels of the Ogallala Aquifer. However, this very small decline would not affect regional groundwater levels and would represent approximately 5.0 percent of the available groundwater. The total site groundwater withdrawal including this facility would be 343.6 million l/yr (90.8 million gal/yr) which, because of expected cutbacks in other programs, would be 59 percent less than the 836 million l/yr (221 million gal/yr) currently being withdrawn from wells at Pantex.

Construction and operation of the new facilities would not result in direct discharges to groundwater. Treated wastewater discharged to playas, could percolate downward into the groundwater of the near surface aquifer. However, water discharged to playas would be monitored and would not be discharged until contaminant levels are within the limits specified by the TNRCC. [Text deleted.]

Although the expected drawdowns caused by withdrawing the water required for this alternative are small, the overall decline in groundwater levels in the Amarillo area is of concern. Possible groundwater conservation measures at Pantex that could be considered including decreasing research farm irrigation demands through dry farming, installing dripless faucets, and process water reuse. In addition, to alleviate some of the effects from pumping groundwater from the Ogallala Aquifer, the city of Amarillo is considering supplying treated wastewater to Pantex from the Hollywood Road Wastewater Treatment Plant for industrial use. However, details of this measure have not been determined.

Oak Ridge Reservation

Surface Water. Water required for construction and operation of the pit disassembly/conversion facilities would be provided via existing distribution systems. The source of this water is the Clinch River and its tributaries. [Text deleted.] During construction, the total quantity of water required would be approximately 1.9 million l/yr (0.5 million gal/yr), which would represent a 0.01-percent increase over the existing projected annual surface water withdrawal. This additional withdrawal would cause negligible impacts to surface water availability. During operation, water requirements would be approximately 94.6 million l/yr (25 million gal/yr) annually. This represents a 0.6-percent increase in the projected annual surface water withdrawal and is 0.001-percent of the average flow of the Clinch River (132 m^3/s [4,647 ft^3/s]). These additional water withdrawals from the Clinch River would not impact availability.

During construction of the pit disassembly/conversion facilities, sanitary wastewater (total of 1.9 million l/yr [0.5 million gal/yr]) would be generated and discharged to the existing wastewater treatment system in the Y–12 area. This would cause a very minor increase in the effluent from this facility. During operation, a total of 85.2 million l/yr (22.5 million gal/yr) of wastewater would be generated by the facility. This would cause a 3.7-percent increase in the effluent discharged from the Y–12 Area. All discharges would be monitored to comply with discharge requirements. Fire sprinkler water and truck hosedown water would be collected in tanks, monitored for radioactivity, and then transferred to a treatment facility as required. Uncontaminated water would be pumped to storm drains.

Since the pit disassembly/conversion facilities would be located outside both the 500- and 100-year floodplains, there would be no impacts to floodplains.

Groundwater. No groundwater would be used for any project-related water requirements and no wastewater would be discharged directly to groundwater; therefore, neither groundwater quality nor availability would be affected.

Savannah River Site

Surface Water. No surface water would be used for project requirements during construction or operation of the facility. [Text deleted.] During construction of the pit disassembly/conversion facility, sanitary wastewater (total of 1.9 million l/yr [0.5 million gal/yr]) would be generated and discharged to the sitewide wastewater treatment system, which would not require any modifications. This would represent less than a 0.2-percent increase in the effluent from SRS. During operation, approximately 85.2 million l/yr (22.5 million gal/yr) of sanitary wastewater would be discharged to this wastewater treatment system. This would represent a 12.2-percent increase in the effluent discharged from SRS and would be 1.7 percent of Fourmile Branch's minimum flow. Since this facility can regulate its effluent flow and all discharges would be monitored to comply with discharge requirements, no impacts are expected. Fire sprinkler water and truck hose-down water would be collected in tanks, monitored for radioactivity, and then transferred to a treatment facility as required. Uncontaminated water would be pumped to storm drains.

The potential location of the pit disassembly/conversion facility would be located outside the 100-year floodplain. Information on the location of the 500-year floodplain at SRS is currently available only for a limited number of specific project areas. However, the pit disassembly/conversion facility at SRS would not likely affect, or be affected by the 500-year floodplain of either the Fourmile Branch or Upper Three Runs Creek because the facility would be located at an elevation of about 91 m (300 ft) above MSL and is approximately 33 m (107 ft) and 64 m (210 ft) above these streams and at distances from these steams of 0.8 km (0.5 mi) to 1.5 km (0.94 mi), respectively. The maximum flow that has occurred on the Upper Three Runs Creek was in 1990, with a flow rate of about 58 m^3/s (2,040 ft^3/s). At that time the creek reached an elevation of almost 30 m (98 ft) above MSL (SR USGS 1996a:1). The elevations of the buildings in F-Area are more than 62 m (202 ft) above the highest flow elevation of the Upper Three Runs Creek. The maximum flow that has occurred on the Fourmile Branch was in 1991 with a rate of approximately 5 m^3/s (186 ft^3/s), and an elevation of about 61 m (199 ft) above MSL (SR USGS 1996a:1). Elevations of the buildings in F-Area are more than approximately 31 m (101 ft) higher than the maximum flow level that has occurred.

Groundwater. During construction, water requirements would be approximately 1.9 million l/yr (0.5 million gal/yr), which would represent less than a 0.01-percent increase over the projected annual groundwater withdrawal. This additional withdrawal should cause negligible impacts to groundwater availability. During operation, water used for cooling system makeup would be obtained from existing supply systems in the F-Area. The water for these systems is groundwater from the Cretaceous Aquifer. The total annual water requirements shown in Table 4.3.1.4–1 would represent a 0.7-percent increase in the projected No Action groundwater usage at SRS. The water withdrawals from groundwater would not impact regional groundwater levels. Previous studies using numerical simulations of groundwater withdrawals over 20 times greater than that required for the pit disassembly/conversion facility from the Cretaceous Aquifer indicate that drawdown could be almost 2 m (7 ft) at the well head, but would be smaller in overlying aquifers and would not extend beyond SRS boundaries in any aquifer (DOE 1991c:5-196). Therefore, it is expected that withdrawals attributed to the pit disassembly/conversion facility would have a minor drawdown at the well head and would not affect any aquifers in the area. No wastewater would be discharged directly to groundwater; therefore, groundwater quality would not be affected.

[Text deleted.]